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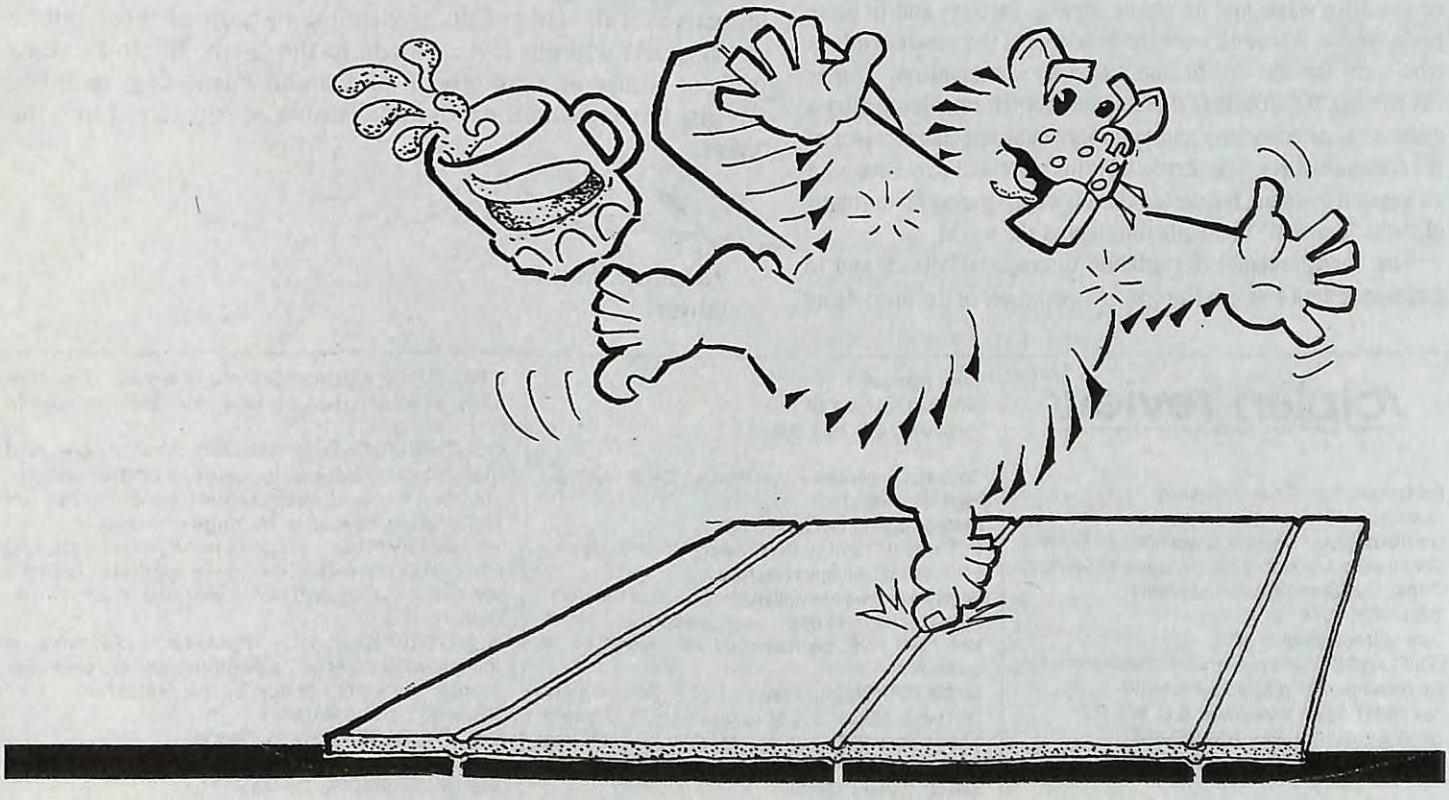
Seam Telegraphing



From the Editor . . .

Environmentalists have been telling us to think globally, and act locally. The intent is to highlight the need to consider that the actions we take every day do not compromise the environment, even if the actions seemingly may not have a big impact. In fact, many small actions multiplied on a national or global scale will have a significant impact.

Global warming is perhaps the most disturbing issue at the heart of the environmental agenda. It is a big notion that we all have a difficulty understanding. Climatologists are telling us that we have already altered the climate on the earth, and the rate of change is increasing. Unless speedy action is taken, the impacts are going to be severe.

We are beginning to realize that global warming will have effects none of us can predict directly. The increase in frequency and severity of "storms of the century" or "floods of the millennium" are indicators that something is happening. Saskatchewan builders have already noted an increased number of strange weather events on the prairies. The insurance industry worldwide is starting to take note.

I was in Poland last month, which has been devastated by floods brought on by torrential rains in the south of the country and in the Czech Republic. In North America we don't appreciate the importance of the flooding that has taken place. When Wroclaw (a city of 650,000 people - about the same size as Winnipeg) was flooded, it also meant that the city had no power, no drinking water and no phone service, for days and in some parts, weeks. Worse off were the hundreds of thousands of others who were flooded out in many smaller communities. This is devastating for a country that has just started rebuilding after a generation of economic and environmental mismanagement of the communist era. The torrential rains in Poland may have been an unusual incident, but we are already experiencing far too many of these "unusual" incidents throughout the world.

The environmental degradation throughout Poland, and in fact throughout Eastern Europe, is an example of the impact that insensitive development can cause. In many areas, the conditions were detrimental to human health. Fortunately, the worst excesses are starting to be cleaned up, but still very slowly.

So what does this have to do with builders and the building industry? Ours is one of the major industrial sectors. The materials we use, the buildings we build, the communities we build, all have a major impact on the global environment. Unless we aggressively pursue actions that will reduce the environmental impact of our work, we will continue to be a part of the problem. Many actions can be taken to reduce the negative impacts. At the individual level, we should choose materials and techniques that make most efficient use of resources, and designs and detailing that reduce use of energy and other resources. At the community level, community design should reduce reliance on inefficient transportation systems. Energy efficiency is one yardstick (but not the only one) that can be used to assess the impact of buildings on the environment.

Collectively, as an industry, we must aggressively pursue actions that will have a positive impact for the environment of future generations. The image our industry has, unfortunately, tends to be one that is largely insensitive to the environment, is less than enthusiastic about energy efficiency, and is more interested in it's own bottom line than the public good. Regretably, the unbridled marketplace does not put much value on the long term healthy environment.

To my mind, too much effort is put into a narrow focus on regulatory issues, without consideration for the motivation behind those regulations. We must search for a way to be proactive on the side of the environment, to meet those public policy goals without laying waste to the earth. It can be done without compromising ethical and sound business principles. We just have to find the will and creative energy to put into the effort.

Richard Kadulski,
Editor

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Seam Telegraphing

Seam (joint) telegraphing is the term used to describe the visible joints in the subfloor under thin floor finishes, usually sheet vinyl. Seam telegraphing is visible because of light reflection off the surface of the finish flooring. It can also be due to delamination between the vinyl and the underlayment along all joints where filler has been applied. Seam telegraphing has become less acceptable to the consumer.

Seam telegraphing has been with us ever since sheet materials, like linoleum, have been used even before the development of wood-based panel materials. What has changed, especially when panel materials were introduced as underlayment, are the expectations that consumers have for the appearance of their floors. The thickness of flooring goods has also been reduced for economic reasons.

Generally, seam telegraphing is caused by moisture changes, usually because of moisture gain by the underlayment. The shrinkage or expansion of the underlayment panels leads to shifting and closing of joints between panels. The problems do not seem dependent on one material or product alone. Unfavourable environmental conditions and installation practices are more responsible for many seam telegraphing problems than the inherent nature of the product.

To avoid this problem, understanding the circumstances that lead to seam telegraphing is important. A study just completed by DMO Associates has looked at the problems leading to seam telegraphing and what can be done to reduce them.

Subfloor materials

Materials used for underlayment applications include plywood, particleboard, hardboard, oriented strandboard, and fibre reinforced gypsum panel products. Whatever the choice, there are some specific and some common requirements.

Installation practices appropriate for the underlayment being used should be followed. The recommended minimum practices for installation of underlayment distributed by the manufacturers have been tailored for their particular products.

Only underlayment materials backed up by warranties should be used. The manufacturers go to great lengths to provide a product that meets the intended function.

Adequate subfloor preparation is needed. It will pay off in the end. The goal is to provide a smooth clean sound surface to which the underlayment can be attached so the two layers are in very close contact. All needed repairs should be made and power sanding is required to remove irregularities of all kinds. If patching fillers are needed, they should be done on the subfloor, not the underlayment.

Whatever the fastener chosen, good contact is essential to reduce the formation of punch outs (in particleboard) and splinters (in plywood) from the back face. These are just as much a problem with uniform contact between layers as are grit and other debris. Given the frequency of complaints about seam telegraphing a conservative approach to attachment is justified.

Seam telegraphing has been with us ever since sheet materials like linoleum, have been used . . . what has changed are consumer expectations.

Major sanding is needed where individual subfloor panels are installed "upside down" compared with the adjoining panels. Telescoped T&G joints and swelled panel edges should be sanded flat. Additional fasteners may have to be installed to ensure a tight fit to the joists. Existing protruding fasteners should be hammered or screwed in tightly so there are no squeaks.

Sheet goods (vinyl and linoleum)

The choice of finish flooring is part of the problem. When the thinnest vinyl flooring is used, try to avoid using vinyl with very light colours with glossy surfaces. Light coloured, glossy surfaces accentuate any imperfections. Textured surfaces and patterns break up reflected light and help hide minor imperfections in the surface below, includ-

The greatest hazard to a successful flooring installation is high moisture conditions.

ing streaking adhesive lines. Heavy duty vinyl has a thicker wear surface and the backing is thicker which helps reduce telegraphing.

Seam telegraphing rarely occurs for stick-on tiles or individually bonded tiles and is less likely to happen when perimeter bonded vinyl sheet flooring is used. On the other hand, bonded sheet vinyl can be thinner (and cheaper) than other sheeting goods simply because it is fully backed up.

Perimeter bonded vinyl flooring is less susceptible to minor faults in the underlayment, but where there is a major problem in the material at the seams it will show through whatever the thickness. As much care should be taken in the installation of the underlay for perimeter bonded vinyl flooring, as for a fully bonded vinyl flooring.

High solids content acrylic adhesive should be used for bonding the vinyl to the underlayment. This reduces the moisture added to the material and reduces the chance of a loss in bond in areas where thermal gradients might lead to condensation within the underlay (such as at cold spots of the floor near doorways and patio doors).

Underlayment materials

All wood materials experience some dimensional change with moisture changes. Gluing the underlayment to the subfloor will reduce the tendency for seam telegraphing. To reduce the quantity of moisture in the adhesive and to ensure greater long term durability in the bond for the given site conditions, a high solids content adhesive should be used. Polyvinyl acetate (PVA) adhesive is normally used in this application.

The underlayment installation should be as free as possible of the need for surface levelling by patching. This is to reduce the possibility that poor bonding may happen between the patchmaterial and the vinyl.

Uniform gaps between panels are essential.

A fastener pattern appropriate to the characteristics of the underlayment and its thickness should be strictly followed.

The frequency of attachment, specially around the perimeter of the panels, should be doubled beyond the spacing recommended by the manufacturer when the environmental conditions are not conducive to a trouble free installation.

Estimating moisture content by touching a material by hand is simply not good enough. Flooring trades should become familiar with and regularly use a moisture meter. . .

Plywood and other underlay materials that have a lower linear expansion characteristic and may be preferable to use in some circumstances.

Installation practices

To reduce the potential for seam telegraphing, it is critical that installation of the underlayment, preparation of the joints and laying of the vinyl flooring is done so that differential movement between panels and layers is reduced. This means that different installations are likely to have different forces at work, and the builder and installer have to compromise as to the best time for installation of these materials.

The greatest hazard to a successful flooring installation is high moisture conditions. No vinyl installation should be done if there are still stages of construction that will add high moisture levels.

The moisture content of various materials - the floor joists, the subfloor, and the underlayment can be different. Each will set up forces in different directions as they dry. A wet joist or subfloor will contribute moisture to a dry underlayment, so that one material will start to shrink, while the next one starts to expand.

Moisture meters should be used to assess the moisture content of wood-based materials, and whether they are picking up moisture or drying out in the particular environment they are in. This can be judged by measuring the moisture content of the surface and inner fibres. The relative humidity can also be estimated and decisions to speed drying can be made so that scheduling of finishing activities can be better based.

It is important to remember that relative humidity is not constant, and dependent on the temperatures. Flooring trades should become familiar with and regularly use a moisture meter for the moisture conditions of the floors and materials on the site. Simple resistance-based meters with bare pins are relatively rugged and inexpensive. Estimating moisture content by touching a material by hand is simply not good enough.

Freshly poured basements can add a great deal of moisture into poorly ventilated spaces andcreate conditions under which no responsible flooring installer can guarantee proper performance. If scheduling is tight for occupancy, leaving the floor incomplete for later installation when conditions are more favourable is better. Otherwise, expect to have to replace the floor.

Manufacturers advise that underlayment panels should be conditioned in the environment they will be used in for 24 to 48 hours in advance. The preconditioning can even be done at another, more convenient location. Panels must be kept flat during preconditioning. If set against the wall to condition, they can develop an uneven curvature. The crucial point is the moisture content in the panels - that is why a moisture meter is essential.

There is little point in attempting to precondition panels for unrealistic and unsatisfactory end conditions. The underlay should be conditioned to a moisture content that is in the midrange of the expected yearly moisture content range. If the moisture content of the subfloor is no more than 15% moisture content, it is tolerable. When the moisture content of the subfloor is more than 15% and the underlay has been installed over it, the installation should be allowed to condition together to acceptable levels before any joint filling is done.

The subfloor should be swept and vacuumed before installation of the underlayment to ensure that no dirt gets trapped between the two layers.

Underlay panels should be laid perpendicular to the subflooring panels with a minimum overlap of joints in the subfloor of 8" (200 mm) in all directions.

Whether joints between panels are to be filled or not, and before any filling, the underlay joints must be sanded level. Good subfloor preparation should be used to eliminate the need for any face levelling with patching materials on top of the underlayment. Vacuuming of all sanding debris on panels and in joints must then take place.

Panels should be butted lightly, to avoid joints that need filling. For joints in particleboard that are 1/16 inch or greater, cementitious joint filler must be forced to the bottom of the underlay thickness.

If neat, light butts are not possible, gaps should be made wider so they can be filled properly. Before the filler is applied, at least one day should be allowed for expansion after the underlayment is brought in contact with the subflooring.

Variable width joints that require filling at one end but not at the other should be widened by cutting to ensure the entire length of the panel edge can be filled uniformly. Extra time is required for conditioning, joint curing and sanding.

Thin (¼") underlay materials may be installed with all joints filled, but care must be taken to ensure that the corners at edges are sound. Slight tapering of panel edges with a construction knife is an acceptable way of ensuring that filling can be accomplished more completely. This applies to both particleboard and plywood edges.

Weakened plywood face veneer edges must be put in non-critical locations, or be trimmed off in the same way as the edges for thin particleboard may be tapered. Lining up of the core veneers in adjacent panels is critical. The maximum gap width is 1/32" because the plywood will not expand to the same degree as particleboard. If this gap limit is exceeded, the joint must be widened by cutting to ensure that it is properly filled.

Vinyl flooring should not be laid on floors immediately after installation of the underlay. Time is needed for the final stage of preconditioning between the underlay and the subfloor. If maximum permitted gaps are present, it is best that the panels be permitted to "grow" to reduce the change that occurs after the vinyl is laid. ☼

Seam Telegraphing: an Examination of Causes and Recommended Practices, *by DMO Associates, for CHBA*

Residential Energy Efficiency Database

The Residential Energy Efficiency Database (REED) is a free educational style, interactive electronic information service that provides a wide range of understandable information on healthy, energy efficient residential housing and energy usage. User-friendly, and designed for quick and efficient information access, REED contains usable information for everyone. Energy efficiency is very important because it is one of the quickest, most cost-effective way to reduce energy related emissions associated with acid rain, smog, global warming and climate

REED is available on the World Wide Web at: *http://www.its-canada.com/reed/*

Home Energy Ratings - the U K Experience

by Mark Gorgolewski

Like fuel consumption figures for cars, home energy ratings in the UK aim to be a simple method of telling the homeowner about energy efficiency in the home and allow an "apples to apples" energy efficiency comparison of dwellings. Domestic energy ratings have existed in the UK since the introduction of the Milton Keynes Energy Cost Index (MKECI) in 1985. This rating was developed for the new city of Milton Keynes, which has a history of innovative energy saving projects. An energy performance standard also applied to an area of the city called the Energy Park. The aim was:

- To give architects with little experience of computers or energy issues a home energy assessment tool.
- To provide a computer assessment in no more than about 30 minutes using only information normally available to the architect.
- To create a program that could be endorsed by the Building Research Establishment in the UK.
- To create a program that would be acceptable to major fuel utilities.

It was also recognised that the program could have a major educational value, so it had to be relatively simple to understand.

The MKECI was first used to assess 50 dwellings built for the "Energy World" exhibition in the Energy Park in Milton Keynes in 1985. It was then extended to all 550 dwellings built in the first phase of the Energy Park.

The scheme was well received by householders and developers, so by late 1988 it was extended so that all new dwellings built within Milton Keynes were required to meet the minimum MKECI standard.

National Home Energy Rating (NHER)

From discussions with developers and builders it was found that the MKECI was not readily converted into a marketing tool for low-energy homes. As a result, the National Home Energy Rating Scheme (NHER) was developed, and launched in 1990.

The NHER provides energy labels on a scale of 0 (poor) to 10 (very good) for dwellings. It is based on the predicted annual energy costs (predicted utility fuel bills) per square metre of floor area of the dwelling calculated on a standard occupancy of 9 hours heating per day during weekdays and 16 hours per day during weekends to 21°C in the living room and 18°C elsewhere. Energy used for space heating, hot water, cooking, lighting and electric appliances are considered. Ratings are delivered and certificates issued by trained and qualified assessors. Several programs are available aimed at both the new and renovation markets. Some software used allows more detailed analysis to be carried out to provide useful diagnostic information.

The NHER rating is based on a calculation procedure known as BREDEM (Building Research Establishment Domestic Energy Model) which is a two zone, variable base, degree day calculation devised at the UK's Building Research Establishment in the 1980s, and has been validated against monitored data.

The model assumes that the house is not uniformly heated. The main living space of the house is heated to a higher temperature than the remaining spaces (e.g., bedrooms). It takes into account orientation, form, construction, heating and hot water systems, controls, and provides a prediction of cooking, lighting and appliance energy use based on the floor area of the dwelling.

To take into account the effect of internal and solar gains, a concept of a "base temperature" is used, which is the external temperature at which the house requires supplementary heating. This is the outside temperature at which internal and solar gains are not enough to maintain the desired interior temperature. The BREDEM model calculates the expected internal and solar gains and predicts the increase in temperature that will result, to calculate the base temperature at which the dwelling will require heating. This temperature is then used to calculate the number of degree days that the dwelling requires heating.

The energy use predictions are converted into fuel cost figures using a weighted average of the fuel prices in the last three years. These are indexed to the Fuel Price Index, which ensures that the rating does not change with each fuel price change.

Mark Gorgolewski is a registered architect in the UK, with extensive experience with energy efficiency in the residential sector. He is a National Home Energy Rating Plan Assessor.

The scheme has been widely taken up, especially by the social housing sector, to set minimum standards and performance targets for new construction and renovation work. Many leading builders, Housing Associations, Local Authorities, architects, and energy consultants are members. To date more than 100,000 certificates have been issued. It has been found that the average rating for the UK housing stock is estimated to be between 4 and 4.5, while dwellings built to current Building Regulations score about 7.

A typical NHER assessment costs about $180 to $260 although it is up to the individual assessor how much they wish to charge. Each assessor undertakes a 3-day training course and must pass a theoretical and practical exam. There are also quality assurance procedures in place to ensure the ongoing competence of assessors.

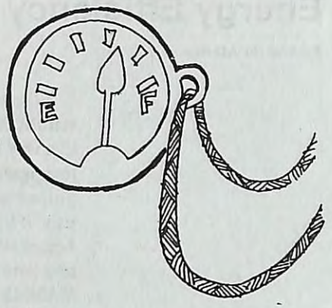
Each assessment provides a certificate for the building owner, and for existing buildings also results in a set of recommendations about how to improve the dwelling. A certificate is issued once the specification is finalised or sometimes only when construction is complete.

Standard Assessment Procedure (SAP)

In 1992 the UK Department of Environment introduced its own energy rating scheme known as the Standard Assessment Procedure (SAP). This government-sponsored rating was designed for inclusion in the Building Regulations for England and Wales, and since 1995 all new dwellings require a SAP energy rating. However, this required some certain simplifications to the methodology used. This has meant that:

- In order not to vary the compliance requirements geographically, the SAP energy rating is independent of location. All dwellings are assessed as if they were in the Midlands.
- The SAP calculation process has to be simple enough to be calculated by hand using a worksheet, although computer programs are available.
- As the Building Regulations mainly apply to the construction of the building rather than the appliances used inside, the SAP energy rating should not depend on moveable items of equipment.

These limitations mean that the SAP only considers heating and hot water energy use and cannot take into account many significant factors such as location of the site, sun-rooms, open plans and certain combinations of heating system. For this reason SAP calculations can't provide an accurate prediction of running costs or savings due to efficiency upgrades or introduction of improvement measures and should only be used to establish and compare energy ratings.



The Fuel Price Index is similar to the Consumer Price Index: it measures the inflation of average domestic fuel prices compared with a base year in the past. As the energy ratings are based on predictions of annual fuel costs, it is necessary to ensure that ratings do not change merely because of the effect of overall inflation.

The SAP rates dwellings on a scale of 1 (poor) to 100 (good) based on the predicted heating and hot water fuel costs per square metre of floor area (other energy uses are not considered). Several commercial organisations produce software programs that calculate the SAP, and NHER software produces a SAP rating and also its own rating.

Although in principle the introduction of the SAP was seen as a positive step in the process of increasing the use of energy ratings and improving awareness, the simplified calculation procedure and other limitations have reduced the credibility of energy ratings, and the SAP is now scorned in many quarters. On the other hand, the more comprehensive NHER is better regarded both as an energy rating and a design tool.

The ability to provide detailed diagnostic information can be valuable in assessing or developing improved design proposals. It highlights problems and encourages the designer to adopt an integrated design approach.

There is much controversy that both these energy rating schemes are based on fuel costs rather than a more absolute environmental measure such as carbon dioxide emissions. It makes the rating vulnerable to changes in the relative costs of different fuels. The compromise was made to gain support from all the fuel utilities.

In the UK, electricity is predominantly generated from coal, oil and increasingly natural gas, and at £0.075 per kW is much more expensive than gas at £0.017 per kW. UK electricity also generates about 174 Kg CO_2 per GJ of delivered energy that is much more than natural gas at 54 Kg CO_2/GJ. Because of these price differentials achieving a high rating with a gas heated dwelling is generally easier than with an electrically heated dwelling, which at least reflects partially the increased carbon dioxide emissions that result from UK electricity generation. ☼

Energy Efficiency Retrofits

by Martin Mattes

Where do you start with an energy efficient retrofit of an existing home? The most cost effective way to decide new insulation levels and areas to upgrade is to model the home or renovation project with a computer program. Much the same way R2000 builders have been modelling new homes with the HOT2000 software to learn where and how much insulation they are going to install, CANMET of Natural Resources Canada has developed a new software program called AUDIT2000. Essentially it is the same as HOT2000 but it makes the modelling of existing homes much easier.

The program models existing building parameters such as heating equipment and variable base loads, and has a complete information section that does not affect the energy output but is useful for statistical purposes when printing out a report for the homeowner.

With nearly eight years worth of HOT2000 experience modelling many new R2000 and conventional homes with respect to energy efficiency, I was recently given the opportunity to teach a six-week Building Analyst Course in Sydney, Nova Scotia. In first-time modelling existing houses with energy efficient upgrades, some enlightening realities glared not only at me but also at my students.

In total, the class as a whole modelled about 85 houses in the Sydney area and we had to ask some fundamental questions, starting with: Why do homeowners replace windows? For all the houses we modelled, the best case had a 28-year payback and the worst more than 40 years. The obvious reason homeowners replace windows are: the windows have failed; they add value to the home; to "keep up with the Jones"; or for aesthetics reasons. However, strictly from an energy standpoint, it is probably one of the worst investments that can be made. Naturally, the window manufacturers don't want you to hear this! The reason for the long term payback is simple: old windows have an R-value of about 1.05, while a new vinyl, low-E, argon gas, insulated spacer, casement window will have an effective R-value of about 2.93.

RETROFIT ACTION	SAVINGS/YEAR	COST OF RETROFIT	PAYBACK (YEARS)
Air seal to 1.5 ACH @ 50 Pa., install HRV	$215.77	$3,600.00	16.7
Replace all windows with low-e, argon gas, vinyl casement	$446.34	$14,500.00	32.5
Insulate basement walls to R20	$110.04	$1,400.00	12.7
TOTAL	$772.15	$19,500.00	25.25

While the air leakage is reduced, both the old and new windows cover the same area and the R-value has only increased by two. There is still considerable heat loss. Another concern is that sometimes improving the window can lower the net solar gains. Yet homeowners have the misconception that replacing windows is a great energy efficient retrofit. The computer models do not lie. Window replacement is not money well spent with respect to energy savings in energy retrofits!

This is not to put down high performance windows. In new construction or where new windows must by used, they should always be considered. However, if the replacement is simply driven by energy retrofit considerations, a more careful analysis is needed.

In all the homes we modelled, not one of our reports to the homeowner recommended replacing windows! Air leakage control is one of the greatest areas with a significant payback, but introducing mechanical ventilation to ensure good indoor air quality may offset the payback to the point where financially it becomes a hard sell. While you cannot easily put a price on indoor air quality, some consumers have a limited budget and will not accept a 14-year payback to air seal their home and then introduce ventilation to offset the tightness. You have to educate the homeowner and explain the added occupant comfort due the reduced drafts, increased indoor air quality and control. In addition, the reduced infiltration of moist air into the building assembly will prolong the structure's life.

Another big misconception with most consumers is thinking that the ceiling is an area of high heat loss. Although adding insulation to the attic is usually inexpensive, normally the ceiling accounts for only 3-9% of the heat loss of the entire building envelope. The basement floor routinely has a higher heat loss, mainly because the basement floor has the same surface area but usually has an effective R-value of 1.14 (i.e., no insulation) while the ceiling will normally have R20-40.

Let's look at a typical 1,200 sq. ft. raised bungalow I modelled recently in Kitchener, Ontario. First, I addressed the home itself and tried to model the following upgrades. (The main walls accounted for most of the total heat loss. However, the home is brick and there were no cost effective measures to insulate the exterior walls so I chose not to suggest any changes to the walls.)

Clearly I was not going to sell the home owner on any kind of retrofit job at these paybacks, so I started over and addressed the heating system. The original home had an oil furnace and electric domestic hot water heater. However, it happens they have natural gas in the area.

While replacing the furnace did not actually increase the efficiency of the home, the payback is an amazing 2.1 years and the truth is, after year two the homeowner will be saving $1,300.00 per year. This home owner is happy that he is under budget, did not spend money on retrofits that provided unrealistic paybacks and he was ecstatic that he hired me for $250.00 to give him a report that saved him thousands in unnecessary renovation work.

RETROFIT ACTION	SAVINGS/YEAR	COST OF RETROFIT	PAYBACK (YEARS)
Install draft induced gas furnace, lease hot water tank	$1,311.83	$2,800.00	2.10

The crucial point is, if you are not a design evaluator, either buy the software and get the training or hire a Building Analyst/ Design Evaluator. Your local CHBA office should have a list of names. The couple of hundred dollars you spend on the report could save you and your customer thousands of dollars on unnecessary retrofit work, and will make you look more professional in the end.

What I am suggesting here is that there may be several ways to serve the customer. Not always are those that seem obvious at first glance the best or most cost effective. Tools have been developed, and they should be taken advantage of. They may surprise you, and put you in good light with your customer. ☼

Martin Mattes has been actively involved with the renovation and new construction sector in Nova Scotia - as a college instructor, builder, realtor, R-2000 Design Evaluator and New Home Warranty Director. He is presently building a new home in Cambridge, ON, where is taking up residence.

Beware of Manufacturers' Claims

Every so often a product is promoted as able to perform in an application for which it has not been tested. One such case that has come to our attention recently is Thermo-Foil.

Thermo-Foil is a polyethylene bubble pack material finished with an aluminized reflective coating. It has been evaluated by CCMC for use in a wall cavity system, where it is used for the air and vapour barrier and as a reflective thermal barrier.

However, for the last year or so Thermo-Foil has been claiming an R-10.5 value when used as under slab insulation (an application for which it has not been evaluated.) The claim that the membrane has an insulating value of R-10.5 leaves something to the imagination. In a wall or ceiling application, with a furred air space, the material adds the equivalent of about R-4 to the assembly. It stretches the imagination that by itself, under a concrete slab, with no airspace other than the bubble pack itself, it will have an R value of 10.5!

The claim is based on a thermography test. Unfortunately, thermography is a tool used to observe where heat flows through a building assembly, but it is not a recognized test procedure for measuring thermal insulation values.

Because of the aggressive marketing, many builders, especially in New Brunswick, have become interested in using the material for its insulating properties. However, they will not receive credit for this for their R-2000 homes. If something looks too good, ask questions, but don't rely on the manufacturer for all the answers. Get an independent opinion.

When used below grade, under the slab, the sales literature is correct to suggest it will eliminate basement dampness. As this material is a multiple-layered laminated material, it will be a tougher, more effective moisture barrier, better able to resist damage during construction than regular poly.

Thermo-Foil
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Technical Research Committee News

Canadian Home Builders' Association

Bruce Clemmensen New Chair of Canadian Commission on Building and Fire Codes

Bruce Clemmensen, the immediate Past President of CHBA and former Chair of the TRC is the new chair of the Canadian Commission on Building and Fire Codes (CCBFC). He takes charge as the commission launches a major change in direction with the transition to objective-based codes.

Clearances Between Cooking Stoves and Combustible Materials

The 1995 NBC introduced new requirements for clearances around cooking stoves. Although these requirements generated no comment during public review, the kitchen cabinet industry has found them to be too restrictive. Correspondence from the industry and supporting correspondence from CHBA has convinced the CCBFC to reopen this issue, despite the quasi-moratorium on code changes. Staff of the Canadian Codes Centre will consult with interested parties and prepare a new proposal for the fall meeting of the Standing Committee on Housing and Small Buildings.

Particleboard Subfloor

Because of its susceptibility to water damage, particleboard (not to be confused with waferboard and OSB) is permitted to be used for subfloor only in factory-built houses. Even in factory-built houses, however, the Code requires particleboard subfloor to be treated to increase its resistance to water damage when it is used in kitchen and bathroom areas. The 1995 NBC extended this requirement for extra treatment to particleboard subfloor used in all areas. There was no comment during public review, but the mobile home and particleboard industries objected strenuously to this change when the Code was published.

At its February 1996 meeting, the Standing Committee on Housing and Small Buildings instructed staff to investigate the background to this new requirement. That investigation revealed that some concerns were valid and the Standing Committee agreed, by letter ballot, to rescind this change.

The Technical Research Committee (TRC) is the industry's forum for the exchange of information on research and development in the housing sector.
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New Guidelines for Submission of Proposed Code Changes Issued

New guidelines for the submission of proposed code changes have been developed and are now in effect. These guidelines are based on the resolution in the Strategic Plan to place more onus on those proposing changes to the national code to make a convincing case that the change is needed and to provide supporting evidence, a position that CHBA has strongly advocated. A copy of the guidelines is available from the Canadian Codes Centre Web site (*http://www.irc.nrc.ca/ccbfc/codechanges_E.shtml*) or the IRC Autofax (613-990-4101, document no. 1006). Copies will also be available at the September TRC meeting.

Fire and Sound Resistance of Building Assemblies

With changes in building techniques, products and designs used today, the performance characteristics of the many systems have to be understood. Fire resistance and sound transmission are key factors affecting structural and occupant safety.

To learn their performance, a multi part project has been underway at the Institute for Research in Construction (IRC) to test partitions, floor/ceiling assemblies, and floor/wall intersections. The purpose of the project is to update and expand data on the fire and sound resistance of systems and to develop expanded tables on sound and fire ratings of assemblies for the National Building Code.

Gypsum Board Partitions

The fire and sound resistance of a wide range of wood-stud walls and non-load-bearing steel-stud walls likely to be used in the construction of houses and small buildings (Part 9 of National Building Code) were studied. 128 fire-rated assemblies and 156 sound-rated assemblies were submitted to the NBC committee and accepted for publication in the 1995 NBC.

Part 2 of the project, expected to be finished this summer, provides an opportunity to extend the range of wall specimens beyond those tabulated for the 1995 NBC. It will include the fire and sound resistance of load-bearing steel-stud assemblies and shear-resistant assemblies. Thirteen fire tests and 32 acoustical tests will be done, which should result in fire and sound resistance ratings for about 40 assemblies.

Floor/Ceiling Assemblies

Sound transmission will be measured for about 100 floor assemblies; a subset of these will be subjected to fire-resistance tests. This is the first comprehensive study of floors that includes parallel evaluation of fire and acoustics. It will provide a consistent evaluation for floors with wood joists, engineered wood systems, and steel joists and some concrete floors.

Floor/Wall Intersections

Fire stops, which are typically in party walls at the intersection with a floor/ceiling assembly, can seriously degrade the sound isolation of the complete assembly. This is often the reason that lightweight walls and floors that separately achieve sound good ratings in laboratory tests, may have significant noise problems when placed in an actual building.

The objective of this research project is to provide a series of engineered joint details involving fire stops that will meet both the fire-resistance and sound-isolation requirements of the NBC. The fire stop materials listed in the NBC are being examined to assess their impact on the sound isolation of complete building assemblies. New materials and retrofit techniques that will meet fire-resistance requirements are also being studied.

The project has shown the feasibility of evaluating the performance of complete building systems and will produce a listing of fire stops and the STC range for which they will maintain the sound isolation of the complete assembly.

Early work in this study has shown the impact on "as-installed" sound isolation of fire stops. However, other connections required for structural integrity (load-bearing party walls, continuous shear diaphragms, etc.) can provide direct paths for sound to travel between units and, as such, limit the "net" sound isolation.

A second phase of work will deal with sound transmission through structural connections in multi-family dwellings for a broader range of floor and wall systems. This work will run until 1998 and will examine the net sound isolation in a series of nine assemblies based on three major construction types: wood-frame, steel-frame, and masonry/concrete. Effective joint, wall and floor details will be established for these assemblies. The intent is to provide a comparison of the sound-isolation potential of the three major construction types under controlled conditions.

This work is being done by a consortium that includes IRC, CHBA, the Canadian Wood Council, the Canadian Sheet Steel Building Institute, the Cellulose Insulation Manufacturers' Association of Canada, Gypsum Manufacturers' Association of Canada, Owens-Corning Fiberglas Canada, and Roxul Inc. Boise Cascade (U.S.), CMHC, the Canadian Portland Cement Association, the Canadian Wood Council, Forintek Canada Corporation, Gypsum Association (U.S.), Nascor Inc., the Ontario Ministry of Housing, Trus Joist MacMillan (U.S.) and Willamette Industries (U.S.), and provincial new home warranty programs (coordinated through the Ontario New Home Warranty Program).

Using the Enclosed Floor Joist Space as Return Air Ducts: Does It Affect the Indoor Air Quality in Houses?

IRC and CMHC are collaborating on a project to find out the effects of using the enclosed floor joist space as return ducts on indoor air quality. Three types of return duct construction are being investigated - return ducts:

1) with two OSB joists covered with an OSB subfloor and a metal plate,

2) with two solid wood joists covered with an OSB subfloor and a metal plate, and

3) with solid wood joists covered with a plywood subfloor and a metal plate.

In addition, a conventional sheet metal return duct will be used as a reference.

Window Information on the Internet

Thermotech Windows Ltd. of Ottawa has set up a website that besides the usual product literature offered by the company, includes a copy of the comprehensive *Consumers' Guide to Buying Energy-Efficient Windows* produced by the Canadian government. This is an excellent handbook that explains all the fine points of new window technologies.

Hard copies of the handbook are available from Natural Resource Canada. Thermotech has taken it upon themselves also to send out copies to anyone requesting a copy.

Information: Tel. 613-225-1101 Fax: 613-225-4630
e-mail: michael@thermotechwindows.com
Internet: http://www.thermotechwindows.com

The R-2000 Program at 15

The R-2000 Program was launched in 1981, with the intent to improve the energy efficiency of new low rise dwellings. Has it done its job?

Over the 1981 - 95 period, the net direct energy savings from certified R-2000 houses total about 1.2 petajoules (PJ) of energy, while indirect energy savings are about 83 PJ. The total net savings in energy consumption (for direct and indirect savings) is equivalent to the energy consumption of about 150,000 conventional homes. Both conventional and R-2000 homes built to date will continue to accumulate savings over their lifetimes, which can conservatively be estimated at 40 years, so total savings will be much higher.

The program has been very successful at generating indirect energy savings in the Canadian market. While only a modest number of certified houses have been built (about 8,000 to 1997), there has been a strong influence on residential construction overall.

The indirect savings are due to the increased energy efficiency of conventional non-R2000 homes. This has resulted from improvements to energy related technologies and practices over the 1981- 94 period, and upgrades in product standards.

The main components of the program are builder training and certification, home inspection and certification, marketing and communications, standards development and implementation. It is based on a strong government industry partnership, and delivered through industry.

Because the program has been successful at saving energy, it has also been successful in reducing greenhouse gas emissions. R-2000 energy savings and greenhouse gas emission reductions are achieved in two ways - directly in the certified houses, and indirectly through the influence the program has on the building industry.

An internal government audit of the program was recently completed. What did it find?

The customers, the R-2000 home purchasers, are clearly very satisfied with their houses. Features they value include increased energy efficiency, general comfort, construction quality and indoor air quality. Where the respiratory health of residents changed over time, it was usually toward better health. It is noteworthy that about 90% of home owners had bought their house new and were still in the house!

Purely in energy terms, the incremental costs today may not always be cost effective because of today's low energy prices. However, as most R-2000 homes built are custom homes, purchasers are aware of costs and benefits, and are making purchasing decisions based on the many other inherent features of an R-2000 home, beyond the narrow energy payback.

A small group (about 10-20%) had some problems. The most common were dry indoor air, uneven temperatures, or specific rooms that were too hot or cold, noisy HRV's and furnaces. Some of these are clearly poor home design or builder competence, rather than R-2000 related. What is not certain, is what the dissatisfaction level is with a standard house? Do homeowners put up with shortcomings simply because everyone else has the same problem, so it's a matter of "the way things are done?" How often are conventional home purchasers questioned to the extent that R-2000 home owners have been over the years?

Builders are generally satisfied with the program overall, but many do not actively participate because the demand is low. Many use the knowledge and expertise gained through the R-2000 program to differentiate themselves as quality builders.

Low public awareness was cited by builders, utilities and financial institutions as issues that contributed to low demand for certified R-2000 houses.

Utilities have been major players in the program at various times. Utilities have significant credibility with the public, so they can be a big influence on customer opinions and market demand. However, most utilities are now experiencing power surpluses, that ironically have been caused by the cumulative impact of energy conservation measures that started to be introduced in the 1980's.

However, utility new home programs in the past have not presented a consistent message over time. Technical standards, program formats, and marketing approaches have fluctuated widely and left builders and consumers confused.

Realtors surveyed for the audit report that R-2000 homes may be more difficult to sell because of the increased costs. Unfortunately, the realtor sample was too small to be representative. Many are still not familiar enough with R-2000 to be able to give a good judgement of the product. As 90% of homeowners still occupy their original R-2000 house, and many don't intend to move in the future, realtors' experiences are limited. There simply has not been enough activity to be able to establish what the market is!

What were the overall conclusions of the audit? The program has been successful in meeting its energy savings and greenhouse gas emissions reduction objectives. Further, the program has been important in providing a forum for advancing issues related to housing among the various stakeholders involved in a diffuse industry with many players. Most important, home owner and builder surveys show a high level of satisfaction with the quality of certified R-2000 houses. The audit concludes that the program be retained, although some administration and management modifications may be needed.

Unfortunately, a recent Canadian Press story that reviewed the audit focused on the few negatives, and missed the overall picture. ☼

R-2000

For information on the R-2000 Program, contact your local program office, or call 1-800-387-2000

B.C's New Contaminated Sites Legislation

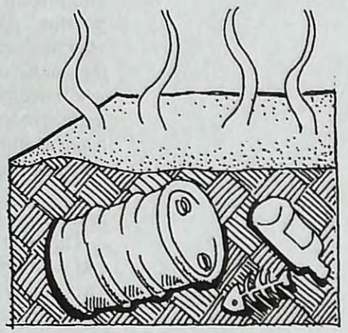
Until a few years ago most people would have considered soil contamination problems to be unusual. Today, it seems that contamination of land and groundwater is everywhere, especially in those areas where the property has been used for commercial or industrial purposes.

Environmental laws have not dealt very effectively with contaminated sites, especially for "orphan sites" (those sites without an owner, or a financially responsible owner) and those with "historic contamination" (caused by the type of uses in the past). Until 1995, there were no established criteria for non-special waste substances.

This is a situation that is not unique to British Columbia, but this province has enacted new legislation (Bill 26) that came into effect April 1, 1997. The law increases and broadens the scope of liability for contaminated sites and defines standards for contamination and remediation.

The objective of the legislation is to provide for permanent solutions to contamination. No definition of "permanent" is given by Bill 26 but a framework has been provided in which the best solution possible under a given set of circumstances may be isolated and acted upon. Satisfactory remediation of a contaminated site may be assessed by numerical standards or risk-based standards.

Bill 26 creates a comprehensive regulatory system to deal with contaminated property, with the basic principle of that the polluter should pay. It imposes environmental liability without need for a government order and it allows for a private right of action to enable parties to claim against and apportion responsibility for contamination among themselves. It will allow an owner or a manager to get on with a site clean up while retaining the ability to recover from those responsible. Anyone who incurs costs to remediate a contaminated site may pursue an action to recover costs from one or more responsible persons.



Recoverable costs include investigation, legal, consultant and government fees besides the costs of the actual remediation work. An alternative dispute resolution mechanism to resolve disputes more quickly and cheaply is also provided.

There is a concern that it will create much work for lawyers, and a new profit centre for those working on contingency fees. However, this view may be an extreme reaction caused by uncertainty created by the new legislation. Once all parties become familiar with the workings of the new legislation, and a judgement or two has been made in a court, reason should prevail.

A key assumption of the new law is that there is (or soon will be) a great deal of information regarding the status of sites. This information will be created and will be available for review through the establishment of a Contaminated Sites Registry. Properties that will be documentedwill be those used for commercial or industrial uses. The Registry will contain information such as site profiles, site investigations, orders, approvals, voluntary remediation agreements and certifi-

- *Applies to commercial & industrial land*
- *Establishes that polluter must pay*
- *Defines contamination standards and remediation*
- *Site profile report*
- *Contaminated Site Registry*

cates of compliance. It will be a public registry for environmental information, operating not unlike the Land Titles Office.

A Site Profile for most sites can be provided through a four-page questionnaire with information on past uses and problems affecting the site. It is essentially a system of self-disclosure and will relate to the subject property and adjacent ones. The first level of reporting should not require testing or sampling. The trigger for completion and filing of a site profile will be an application to develop or subdivide a property used for industrial or commercial uses.

Responsible Persons

An important feature of the legislation is the definition of "responsible persons." It defines past and present owners or operators as "responsible persons." Also identified are producers (someone who produced or handled a substance on the site that caused contamination) and transporters (those who move materials that can contaminate). Where a site is contaminated by migration of a substance from another property, as may happen from a neighbouring property, the current and previous owner or operator of the site from which the substance migrated is responsible.

The legislation imposes absolute, retroactive and joint and several liability for cleanup costs. The liability applies whether the costs are incurred by the government or a third party. Liability applies even where the introduction of the contaminating substance into the environment was not prohibited by legislation at the time it was discharged; or where the discharge was allowed by a permit or other authorization.

This means that even if a person acted in full compliance with the regulations of the day, that person may become liable, years later, to remediate a contaminated site.

However, there are liability defences in the legislation. For example, if an owner or operator was involved with a site before it became contaminated and did not cause any contamination, he will be exempt from liability. Similarly, if a purchaser can establish that he had no knowledge of or reason to suspect contamination, he undertook all "appropriate inquires" (i.e., they followed proper due diligence) and did not cause or contribute to the contamination of the site after purchase, he is immune.

In addition, if the owner was careful, "Acts of God" are exempt as are "Acts of Third Parties" which covers the midnight dumper.

There is also provision for registering liens (as a charge on the property) related to costs of remediation against a contaminated site. Such liens would have priority over all liens, charges or mortgages, except wages and Workers Compensation Board assessments.

The impact, however, will be greatest on those that own, operate on, or work with many different properties, and, in particular, properties that are or have been used for industrial or commercial purposes. When an application for development or rezoning of a property is made, there will be a delay in the processing, as the site profile report must be completed, registered, and reviewed before any further work can be done. ☼

Sustainable Building Northwest: Breaking Through the Barriers

October 27-29, 1997
Seattle, Washington

Information:
Tel.: 206-842-8995
Fax: 206-842-8717
e-mail:
obrien@halcyon.com
http://pti.nw.dc.us/envcl.htm

A regional conference and trade show designed to make sustainable practices the standard in the US Pacific Northwest. Green Building Showcase and Technical sessions will focus on real-life solutions to the difficulties faced when trying to put green building theories into practice.

Highlights include:

Smart Policies for Smart Buildings: programs that describe sustainable design and development, and ways to achieve measurable results.

Economics of Sustainable Building

Innovative Systems and Technologies: solutions than combine technical innovation and practical experience to provide maximum performance

Green Buildings showcase: projects selected for their distinction and general applicability. In depth sessions will show leading edge projects successfully incorporating sustainable features, while addressing issues such as financing, affordability, code requirements, and permitting processes.

The primary focus in on larger buildings: institutional and commercial, however it should be of value to anyone interested in sustainable building practices.

Energy Answers

by Rob Dumont

Rob Dumont is a building scientist with more than 20 years in building energy use and indoor environment. This first column for SOLPLAN REVIEW focuses on what he considers the top 5 technical mistakes made by North American builders.

The top 5 technical mistakes made by North American builders:

1. Componentisis.

Mistake number one is considering a house as a grab bag of individual components and not as a system. One recurring example is wall systems. The better the wall R-value, the smaller the heating system that can be installed. Most builders and energy code writers neglect this important fact. They assume that the cost of the heating system is independent of the cost of the walls for the house.

A common refrain, for example, is that the cost of a 75,000 BTU/hr natural gas furnace is not much more than the cost of a 50,000 BTU/hr unit. However, the cost of properly installing a 75,000 BTU furnace is much more. The larger furnace uses higher air flows, larger ductwork, and more interior volume than the smaller unit.

In many cases the furnace in the energy efficient house can be eliminated, and the house can be heated by a domestic water heater and a fan coil. We can't forget that people don't buy houses because of large furnaces, they buy thermal comfort.

Houses are systems and not collections of unrelated components.

2. Heating system over sizing.

Heating systems in Canadian houses are usually greatly oversized. A recent study by Bert Phillips of Unies Ltd. found that the typical gas furnace was twice as big as the required peak heat loss of the house.

Few people would buy a car with a 400-horsepower motor; such over-sizing, however, is common with residential furnaces. An oversized furnace is more expensive initially, runs less efficiently, consumes more electrical energy for the warm air fan, and is more prone to premature heat exchanger failure due to internal condensation and rusting.

3. Bad Indoor Air Quality.

To be blunt, most new houses stink. The paints, glues, wood products, vinyls, carpets and so on all emit odours. Our aging population is becoming more sensitized to irritants such as odours.

Builders should do a better job of selecting low emitting building products or supply gas masks to the occupants for the first year of occupancy.

4. Optimum Value Engineering

Most builders and designers have never heard of it, and rarely use it. "I've always used 2x4's on 16 inch centres, and damned if I'm going to change."

The purpose of optimum value engineering (OVE) is to design and build so that adequate and not excessive amounts of structural sufficiency are provided. The biggest offender, according to several texts on OVE, is overuse of wood products in framing. Three stud corners, double top plates, overuse of cripples and jack studs, 16 inch centres stud spacing, and use of structural headers on non-structural walls are all common practices that waste wood, adds costs, and reduce the energy efficiency of walls. Batt insulation is cheaper, much cheaper than wood. Every 2x4 stud you don't use in an exterior wall saves about $3.50. The same void filled with batt insulation costs about $0.25 or 1/14 as much!

5. Continuing Education (or lack of)

The final mistake that builders make, and I think the biggest one, is not to keep in touch with improved techniques. The readers of SOLPLAN REVIEW are, unfortunately, a small minority of builders in this country.

None of us would consider using a computer with 8K RAM hooked up to a daisy wheel typewriter. Yet many builders persist in using obsolete, time-and-money-wasting techniques that are the equivalent of using an 8K RAM computer.

Note: Some of you may find the above critique of builders rather extreme. If, however, you want a truly harsh critique of designers and builders, and have access to the Internet, look at the site found at: *http://www.state.fl.us/fdi/e-design/online/9609/lstibruk.htm* and look for the "Ten Dumb Things To Do In The South".

Fifty Years Toward Better Buildings

By Will Koroluk

Fifty years ago, a preoccupation of Canadian builders was keeping water out of walls. The industry then was still struggling to reestablish itself after the Second World War, and many builders — especially homebuilders — had little or no construction experience. Now, the Canadian industry is thoroughly professional and among the most advanced in the world. Keeping water out of walls is still a major concern for builders.

There has, however, been much progress. When the National Research Council established the Division of Building Research (DBR) in 1947, it was to do more than address the general need for building research. Two special tasks were assigned to the new division: to provide technical support for the revision of the National Building Code, and to provide technical support to the national housing agency known then as Central Mortgage and Housing Corporation.

The mistakes made by the industry covered a broad range. Many of them — especially in the homebuilding sector — related to the extended use of insulation and increased humidification in winter without proper regard for the consequences of water vapour and air leakage through the walls and roof. Thus, the building envelope was a prime concern of DBR, a concern that has continued since it was renamed the Institute for Research in Construction (IRC). The organization is celebrating its 50th anniversary this year.

William Brown, a research officer with 26 years at IRC, recalls that some interest in the envelope evolved from an interest in HVAC design. "To do load sizing for HVAC equipment you have to know what loads are going to be imposed by the building envelope, so you have to understand how the building envelope operates," he said. "So there was this interest in the thermal performance, which led to other aspects of the performance of the building envelope." But whatever led to the concern, the result has always been growth in the scientific and technical information needed to produce better buildings.

Mr. Brown referred to work by the late Dr. Neil Hutcheon more than 35 years ago that identified 11 performance characteristics of exterior walls. He calls Dr. Hutcheon "the father of building science in Canada, and maybe internationally, as well." Dr. Hutcheon later became director of DBR.

One of the performance characteristics he identified was controlling rain penetration, and from this grew an increasing concern about the design features of walls. As structural design became better understood, there was a transition from loadbearing walls to curtain walls, and thinner assemblies became possible. Cavity walls became common and, from the mid-1940s on, various forms of rainscreen walls were developed.

The face-sealed walls that first made their appearance in the 1950s were based upon the idea that if you sealed all the holes and joints you would have a wall that kept water out. But, said Mr. Brown, "practice has shown that maintaining the integrity of all these seals is difficult." There have been examples of failures in face-sealed walls from Vancouver to Halifax and even into the United States. This has been true no matter what the cladding material: some failures involved stucco; some involved wood siding; some involved Exterior Insulation Finish Systems (EIFS).

"Unless you're prepared to put significant money into maintenance, the integrity of the seals vanishes and you get water in the walls," Mr. Brown said. As IRC research led to a better understanding of the strengths and weaknesses of various wall designs, the same research was used to update the National Building Code. Some of the newer requirements are based upon a more thorough understanding of air barrier systems, and the manner in which they differ from vapour barriers.

Adaire Chown is a senior technical advisor with the Canadian Codes Centre at the IRC. She said vapour barriers address vapour diffusion — that is, water molecules that diffuse through a material. Air barrier systems, on the other hand, deal with airflow, air leakage, problems of air infiltration and exfiltration. Air barrier systems are critical to envelope performance, she said, "because you can move a whole lot more moisture a whole lot faster with airflow than you can with diffusion."

Vapour barriers, must, of course, be on the warm side of the wall. In theory, she said, it doesn't much matter where air barrier systems are installed because if the air can't get through the wall it's not going to carry moisture into it, either. In reality, though, "it's still safer to have it closer to the warm side because of the possibility of such things as discontinuities of insulation and internal convection."

Will Koroluk is an Ottawa freelance writer specializing in building science.

The 1990 edition of the National Building Code said that if the air barrier system had a low vapour permeance so that it would also act as a vapour barrier, then it had to be closer to the warm side. The concept, however, applies equally to any material in the building assembly that has low air and vapour permeance.

The 1995 edition of the NBC reflects new research that determined how close to the cold side you can place materials with low air and vapour permeance before running into problems. The result is a clause that limits the location of these materials depending on the degree days at the building location and the amount of thermal insulation inboard or outboard of their interior surface, or whether the material is vented to the exterior, as happens with cladding. "It looks like a simple requirement, but there was some heavy-duty research done to support it," Ms. Chown said.

"We could piggyback our needs for Code development on some research the Building Performance Laboratory was doing for a technical guide on air barrier systems published by the Canadian Construction Materials Centre," she said.

While people tend to think of research laboratories in terms of the results they produce, the research tools they develop can also have long-term importance — often in other areas of research. Thus, as computers gradually became cheaper and more powerful, IRC scientists were looking at ways to make greater use of them.

Dr. Donald Stephenson is retired now, but from 1954 to 1988 he concerned himself almost full-time with the performance of the building envelope. He still does a bit of contract work for the IRC, and often volunteers some of his time and knowledge.

He is one of the pioneers of computer modelling, and, with fellow scientist Gint Mitalas did some of the early work on modelling thermal performance of buildings. In fact, he said, "we developed some of the techniques that are still being used." They had been working on ways of calculating heat flow through the building shell under variable outside temperatures.

"Before that, these calculations had been very simple, and assumed that things stayed constant at the worst possible condition. It meant that you calculated how much heat could be lost through a window or wall, but not how it really varied throughout the day. Our techniques for using the computers made possible more realistic calculations on what happens on an hour-by-hour basis."

These techniques are still the primary tools recommended by ASHRAE, Dr. Stephenson said, "and the factors that would apply to different types of walls were worked out and subsequently published in the ASHRAE Handbook of Fundamentals." ☼

Commentary

Skill Still Counts

By Leonard Wexler

A while ago I was amused to listen to Frank Ogden being interviewed on CBC radio. Mr. Ogden is Vancouver's world famous so-called Futurist, a writer and media darling who enthrals interviewers with stories about how technology is changing the world in the most amazing ways. In the National Speakers Bureau's words, "Globally-renowned futurist Frank Ogden monitors the heavens for world-shaping events via satellite from his electronic houseboat in Vancouver. Ahead of his time, outrageous, amazing and just a little eccentric, Dr. Tomorrow's message to organizations is simple: "If you're re not part of the bulldozer, you'll become part of the road."

My amusement gave way to irritation as I realized that the CBC interviewer was being completely sucked in by Ogden's vision of a world where no one has to actually work, or at least get their fingers dirty. At one point Ogden asked why a student would want to listen to a teacher in his French class when he could simply go home to his Internet connection and strike up a conversation with someone in France who would know far more about France than his teacher would.

Ogden continued his self-serving attack on time-acquired skill by suggesting that TV stations would no longer need trained camera operators because consumer market camcorders were so good and common now that any old Joe (or Jill) could send in their film clips for airing on the 6 o'clock news.

Ogden's presentation was a broad insult to all people who work with their hands, or have spent years of their lives developing skills that are not likely to be replaced by robots or other electronic devices. Many activities unlikely to be replaced to a great degree by technology are those involved in

the building industry. Oh, sure, more machines are always being introduced to speed things up, but once you have worked in either of these industries for a while you realize it is not the machine, but the skill of the operator, that makes the difference.

For instance, in homebuilding, pneumatic nailing equipment has to a large extent replaced hammers, but a skilled framer still gets down and dirty while putting up the home, and still suffers the occupational hazards of arthritis, asthma, and serious injury. Today's architect might have an office full of the highest tech computers and design software, but the ideas are still the result of years of training and experience, and it would be good for any architect to get out and do some hands-on building in the real world too.

As I write this, and look out my window, I see my neighbour down on her knees digging out weeds from the joints between her paving stones. Now Mr. Ogden may predict that soon she could just dial up a satellite that will zap the weeds with a laser from out er space, but somehow I doubt that will happen.

The true worry I have is that, of late, so much emphasis has been placed on technology by the mass media. The value of people who work with their hands and their minds is being forgotten, and our children are led to believe that all their needs can be met by the click of a mouse. Almost all our contributing writers to magazines such as this use computers and e-mail to send in their articles. However, it is their work with their hands and their training in their fields, not their knowledge of word processing software, that makes them valuable authors to read. ☼

Leonard Wexler, MAIBC is Publisher/Editor of Build & Green. This article was adapted from a recent editorial by Leonard Wexler in Build & Green magazine, Greater Vancouver's magazine of Home Building, Renovating, Gardening and Landscaping.

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A guide to the B.C. Building Code

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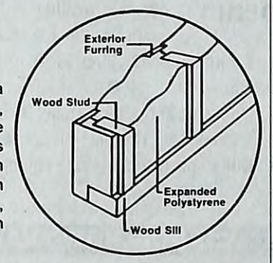

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